large bergs six or seven miles to northward; N. 48° 35', W. 48° 15', one large and one small berg; N. 43° 21', W. 48° 44',

two large bergs and six small detached pieces.

16th.—N. 52° 50′, W. 52° 03′, six large bergs within five miles; N. 52° 37′, W. 53° 21′, one very long flat berg; N. 51° 54′, W. 55° 00′, twelve large and small bergs; three bergs a little south of Belle Isle; N. 43° 32′, W. 48° 22′, a moderate

26th.—N. 48° 55′, W. 52° 53′, a berg 200 to 300 yards long. 27th.—N. 48° 42′, W. 47° 08′, a large berg. 28th.—N. 53° 10′, W. 51° 10′ to Belle Isle, passed upwards of one hundred and fifty bergs. 29th.—N. 53° 00′, W. 51° 15′ to Belle Isle, numerous bergs

of various sizes.

little south of Belle Isle; N. 43° 32′, W. 48° 22′, a moderate sized berg seven miles distant; N. 43° 24′, W. 48° 44′, a moderate sized berg; N. 44° 15′, W. 48° 30′, a large berg; N. 52° 49′, W. 51° 45′, a large number of bergs, large and small. 18th.—N. 47° 37′, W. 46° 28′, a small berg; N. 43° 51′, W. 48° 10′, berg five miles distant; N. 49° 57′, W. 49° 45′, a berg. 19th.—N. 45° 19′, W. 47° 17′, six large bergs and nineteen small pieces and flakes of ice; N. 45° 57′, W. 48° 10′, a large berg and three small pieces of ice; N. 42° 57′, W. 48° 10′, a large berg 45 feet high and 170 feet long; N. 48° 18′, W. 45° 57′, to N. 47° 30′, W. 47° 50′, large and small bergs and pieces of ice. 20th.—N. 44° 13′, W. 48° 27′, a berg about 130 feet high and 975 feet long; N. 43° 13′, W. 48° 02′, a small berg. Capt. Jas. McAuley, of the s. s. "Toronto," reports relative to ice off the north and east coasts of Newfoundland as follows: "June 10th, in N. 52° 10′, W. 54° 00′, passed a large number

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

and Canada for June, 1889, is exhibited on chart ii by dotted isotherms. In the table of miscellaneous meteorological data the monthly mean temperature and the departure from the normal are given for regular stations of the Signal Service. figures opposite the names of the geographical districts in the columns for mean temperature and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Signal Service represents the mean of the maximum and minimum temperatures.

In June, 1889, the mean temperature was highest in the lower valleys of the Gila and Colorado Rivers, where, at stations in adjoining parts of Arizona and California, and in the extreme southern part of Nevada, it rose above 90°, the highest mean value, 92°, being reported at El Dorado Canyon, Nev. At stations in the west valley of the Sacramento River. and within an area extending from Kern county northward over the east portions of Tulare and Fresno counties, Cal., the mean temperature was above 85°. The mean readings were above 80° over the extreme southern and southwestern portion of Florida, at stations on the west Gulf coast, in the Rio Grande Valley, southwestern Arizona, extreme southern Nevada, and at stations in southeastern, east-central, and northcentral California. The lowest mean temperature was reported in central Colorado, where at stations the values fell below 50°. In the lower valley of the Saint Lawrence River the mean readings were below 55°, and the values were below 60° at the more northern stations in the Lake region, at Bandon, Oregon, and on the coast of Washington Territory.

From the Pacific coast eastward over the plateau regions, except in southern California and southern Arizona; along the northern boundary of the United States and in adjoining parts of British America west of the ninety-fifth meridian, and on the Atlantic coast north of the fortieth parallel the mean temperature was above the normal. In all other portions of the country, embracing districts from the Lake region and upper Missouri valley southward to the Gulf of Mexico and the Rio Grande Valley, and in the Saint Lawrence Valley, the month was cooler than the average June. The most marked departures above the normal temperature were reported in northern and east-central California, Nevada, north-central Montana, the British Possessions lying north of Montana and Dakota, and in eastern New Brunswick and eastern Nova Scotia, where they were more than 5°. The departures below

The distribution of mean temperature over the United States | the normal nowhere amounted to 5°, save in northern Louisiana and Indian Territory.

Considered by districts, the greatest average departure above the normal temperature occurred on the middle Pacific coast, where it was 2°.6; in the middle plateau region the average departure above the normal was 20.4; on the north Pacific coast 2°.1; in the northern plateau region, 2°.0; in New England, 1°.4; in the southern plateau region, 1°.1, and on the north Pacific coast, 0°.4. The greatest average departure below the normal, 4°.6, occurred over the southeastern slope of the Rocky Mountains; the average departures varied between 2°.0 and 4°.0 in Florida, the east and west Gulf states, Ohio Valley, lower lakes, upper lakes, upper Mississippi valley, and the middle-eastern slope of the Rocky Mountains, and in the middle and south Atlantic states, Rio Grande Valley, extreme northwest, Missouri Valley, and on the south Pacific coast they were less than 2°.0.

The following are some of the most marked departures from the normal at the older established Signal Service stations:

Above normal.		Below normal.					
Winnemucca, Nev	6.6	Shreveport, La	5.2				
	6.6	Fort Sill, Ind. T	5.1				
	6.0	Saint Louis, Mo.	4.4				
	6.0	Little Rock, Ark	4.4				
	5.7	Alpena, Mich	4.4				

DEVIATIONS FROM NORMAL TEMPERATURES.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for June, 1889; (4) the departure of the current month from the normal; (5) and the extreme monthly means for June during the period of observation and the years of occurrence:

		for the June.	of record.	for June,	re from al.	(5) Extreme monthly mean temperature for June.			
State and station.	County.	(1) Normal month of	(2) Length of record	(3) Mean fo 1889-	(4) Departure normal.	Highest.	Year,	Lowest.	Year.
Arkansas.		0	Years		0				
Lead Hill	Boone	76.8	7	74.9	-1.9	80.2	1885	74.9	1889
Sacramento	Sacramento .	70-3	36	67.8	-2.5	77.0	1853	65.6	1860
Colorado. Fort Lyon	Bent	74· I	20	69.0	-5.1	79.3	1881	69.0	1889
Connecticut. Middletown	Middlesex	66.5	22	67.0	+0.5	72.6	1876	62.9	1863

	viations from			! _		1		··	
		for the June.	ofrecore	or June,	re from	(5) Extreme monthly mean temperature for June.			
State and station.	County.	(1) Normal month of	(z)Length ofrecord	(3) Mean for 1889.	(4) Departure f	Highest.	Year.	Lowest.	Year.
Florida		0	Years			•			<u></u>
Florida. Merritt's Island .	Brevard	i '	5	75.4	-4· I	81.0	1887	75-4	1889
Georgia. Forsyth Illinois.	Monroe	76.3	15	77.0	+0.7	81.9	1880, '81	74-2	1884
Peoria	Peoria McHenry	73·9 66·8	33 33	69.9 63.1	-4.0 -3.7	79·7 73·9	1873 1856	69.4 62.1	1869 1862
Vevay	Switzerland.	73-4	23	70.2	-3.2	77-9	1867	68.4	1869
Cresco	Howard Jones	66.2 65.4	16	63.0	-3·2 +1·4	72.0	1873 1856	62.8 64.1	1877 1863
Kansas.	Harrison	69.9	35 15	70.7	+0.8	74-4	1887	64.5	1876
Wellington	Douglas Sumner	73.6 74.0	20 10	71.2 65.8	-2.4 -8.2	77·2 78·4	1881	69.8 65.8	1878 1889
Grand Coteau	Saint Landry	79.8	6	78.3	-1.5	81.7	1885	78.2	1887
Gardiner Maryland.	Kennebec	62.8	49		· ·	67.3	1856	58.2	1881
Cumberland	Allegany	68.5	29	, ,	-1.3	74.0	1874	63.5	1863
Amherst	Hampshire Essex	66.6 65.0	53	67·2 67·5	+0.6 +2.5	70.6 68.2	1876 1883	59.0	1863
Newburyport	Bristol	68.7	17	71.1	+2.4	72.2	1876	59·4 64·3	1881
Michigan. Kalamazoo Thornville	Kalamazoo Lapeer	67. I 67. 6	12 12	63·7 65·5	-3·4 -2·1	70.0 70.4	1887 1880	63·7 64·1	1889 1881
Minnesota. Minneapolis	Hennepin		24	65.9	-0.7	72.0	1873	61.9	1877
Montana. Fort Shaw New Hampshire.	Lewis & Clarke	62.7	20	63.1	+0.4	70.6	1871	58.1	1877
Hanover	Grafton	64.0	55	65.4	+1.4	69.8	1870	57-9	1839
Moorestown South Orange	Burlington Essex	70·3 69·0	26 17	69. I 68.4	-1·2 -0·6	73·8 73·6	1865 1876	66. 3 63. 4	1881 1881
New York. Cooperstown Palermo	Otsego Oswego	64.0 64.5	35 35	62.9 63.0	-1.1 -1.5	71.9 71.6	1870 1870	57·3 59·4	1863 1855
Lenoir	Caldwell	71.1	17	69.0	-2·1	75.0	1874	63.6	1887
N'th Lewisburgh.	Champaign Fulton	68.9 68.4	57 19	68.4 64.8	-0·5 -3·6	74·0 72·4	1865 1873	61.0 64.8	1879 1889
Oregon. Albany Eola.	Linn Polk	61.4 59.6	10 19	66. I 65. o	+4·7 +5·4	66·1 65·0	1889 1889	59·1 54·5	1880 1873
Dyberry	Wayne	64.2	22	62.0	ا ما	68.2	1870	60.4	1881
Grampian Hills Wellsborough South Carolina.	Clearfield Tioga	66.3 66.2	24 10	66.7 64.6	+0.4 -1.6	70·0 74·6	1865 1883	61.3	1878 1881
Statesburgh	Sumter	76.3	8	74· I	-2.2	80-5	1881	72.4	1884
Austin Milan Texas.	Wilson Gibson	76.2 73.8	18 6	73·4 71·6	-2.8 -2.2	85·5 75·4	1874 1885	72. I 71. 6	1878 1889
New Ulm	Austin	80-4	16	77-4	–3·o	85.0	1881	77 • 4	1889
Virginia.	Orange	66. o	16	66.8	4-0-8	71.1	1884	58-4	1881
Bird's Nest	Northampt'n Wythe	74·4 68·3	21 25	73·6 59·4	0.8 8.9	77·7 73·0	1880 1874	70·4 59·4	1887 1889
Madison	Dane	67.8	17	63.5	-4.3	72.4	1873	62.5	1869
Fort Townsend	Jefferson	59.0	16	60.7	十1.7	61.7	1888	56.0	1879

The above table shows that the mean temperature for the month was above the highest mean reported for the corresponding month of previous years at the stations named in Oregon. At Albany, with a record of ten years, and at Eola, With a record of nineteen years, the mean for the current month was 2°.1 and 2°.7, respectively, above the highest pre-Vious mean noted for 1883. At a number of stations in the interior and more southern districts the mean temperature for the month was lower than the lowest mean reported for June a reading of 31° was reported for the 9th. From northern of previous years. At Lead Hill, Ark., with a record of seven years, the mean temperature for June, 1889, was 0°.5 below the lowest previous mean reading for June, reported in 1886; Fort Lyon, Colo., twenty years record, 0°.3 below mean of 1878; Merritt's Island, Fla., five years record, 2°.9 below mean of 1888; Wellington, Kans., ten years record, 5°.4 below mean of 1886; Kalamazoo, Mich., twelve years record 1°.1 below mean of 1878; Wauseon, Ohio, nineteen years record, 0°.7 below mean of 1881; Milan, Tenn., six years record, 0°.8 below erally ranged above 60°. At a number of stations in the Ohio mean of 1884; New Ulm, Tex., sixteen years record, 0°.8 and upper Mississippi valleys, and thence southward and south-

below mean of 1877, and Wytheville, Va., twenty-five years record, 4°.6 below mean of 1878.

MAXIMUM AND MINIMUM TEMPERATURES.

The highest temperature reported at Signal Service stations was noted in the lower Colorado and middle and lower Gila valleys in Arizona, the highest reading, 112°, being registered at Fort McDowell, Ariz. Within an area extending from the vicinity of Ashland, Oregon, east of south over the Sacramento and San Joaquin Valleys to Tulare Lake the maximum values rose above 100°, the highest reading, 106°, being noted at Fresno, Cal. The temperature also rose to or above 100° at Walla Walla, Wash., Fort Custer, Mont., Fort Buford, Dak., El Paso and Rio Grande City, Tex., Lava, N.Mex., and Micco, Fla. The following are maximum readings in the several states and territories where temperature above 100° was reported, as shown by reports of United States Army post surgeons and state weather service and voluntary observers: Fort Mojave and Texas Hill, Ariz., 113°; Volcano Springs and Cactus, Cal., 120° and 115°, respectively; Grant's Pass, Oregon, 102°; El Dorado Canyon, Nev., 110°; Saint George, Utah, 107°; Powder River, Mont., 110°; Bennet, Colo., 112°; Fort Selden, N. Mex., 106°; Forts Ringgold and Hancock, Tex., 108°; Lead Hill, Ark., 100°; Willow Springs, Mo., 100°; Brookville, Kans., 107°; Fort Buford, Dak., 104°; Ansley, Nebr., 104°; Cameron, La., 101°; Columbus, Miss., 104°; Wiggins, Ala., 101°; Millen, Ga., 100°, and Spartanburgh, S. C., 100°. The lowest maximum temperatures at regular Signal Service stations were reported on the California coast, where 66°, 68°, 72°, and 75° were reported at Eureka, Point Reyes Light, San Diego, and San Francisco, respectively. On the northwest coast of Washington Territory, and along the extreme southern coasts of Massachusetts and Rhode Island the maximum values fell below 80°.

At the following-named stations, all of which have comparatively short records, the maximum temperature was higher than has been noted for the corresponding month of previous years: Huron, Dak., eight years record, 1° above maximum of 1887; Linkville, Oregon, five years record, 2° above maximum of 1887; Neah Bay, Wash., five years record, 2° above maximum of 1886 and 1888; Astoria, Oregon, five years record, 4° above maximum of 1887. At a majority of stations in New England and the eastern part of the middle Atlantic states the highest temperature for June was recorded in 1888; in Virginia, the Carolinas, eastern Tennessee, and northern Georgia in 1887; in northern Florida in 1880; in the Ohio Valley and at Lake Erie stations in 1874; in southern Michigan in 1888; in Minnesota, Dakota, and Montana in 1883; in Oregon and Nevada in 1887; in west-central California in 1883; in Arizona mostly in 1883 and 1887; elsewhere the periods of oc-The highest temperature ever currence were irregular. reached in any month at a regular Signal Service station was 119° at Fort McDowell, Ariz., in June, 1887, and at Phænix, Ariz., in June, 1883. Among extremely high temperatures reported for June in preceding years by United States Army post surgeons or voluntary observers are, 121° at Fort Miller, Cal., in 1853; 120° at Fort McRae, N. Mex., 1873, and 119° at Fort Mojave, Ariz., 1876.

The only regular stations of the Signal Service reporting temperature below 32° were Fort Klamath, Oregon, where the temperature fell to 30° on the 23d, and Cheyenne, Wyo., where New England and the Saint Lawrence Valley westward over the northern portion of the Lake region and the upper Missouri valley, and thence southward over the Rocky Mountain regions to southern New Mexico the temperature fell below 40°. The highest minimum temperature reported was 71°, at Key West, Fla. Over the southern half of Florida, along the west Gulf coast, and in adjoining parts of southern California

eastward to the Gulf and south Atlantic coasts the minimum temperature was the lowest noted for June during the periods of observation. At Lynchburgh, Va., with a record of seventeen years, the minimum temperature for the current month Bermuda, Ala., on the 1st. was 4° below the lowest reading for June, which occurred in 1880; Charlotte, N. C., eleven years record, 7° below minimum of 1884; Charleston, S. C., seventeen years record, 6° below minimum of 1887; Augusta, Ga., seventeen years record, 11° 8° below minimum of 1884; Jacksonville, Fla., eighteen years record, 8° below minimum of 1884; Cedar Keys, Fla., ten years record, 6° below minimum of 1884; Atlanta, Ga., eleven years record, 15° below minimum of 1879; Pensacola, Fla., ten years record, 9° below minimum of 1881 and 1888; Mobile, Ala., nineteen years record, 10° below minimum of 1888; Montgomery, Ala., seventeen years record, 9° below minimum lowest recorded for June. The average dates of last damage of 1888; Vicksburg, Miss., seventeen years record, 1° below ing frosts for stations in the south Atlantic and east Gulf states minimum of 1879; New Orleans, La., nineteen years record, occur in March. In Iowa, where at nearly all Signal Service 7° below minimum of 1879; Little Rock, Ark., ten years stations the temperature was the lowest on record for June on record, 4° below minimum of 1882; Chattanooga, Tenn., eleven years record, 12° below minimum of 1879; Knoxville, Tenn., nineteen years record, 3° below minimum of 1878; Memphis, Tenn., seventeen years record, 6° below minimum of 1888; Nashville, Tenn., nineteen years record, 2° below minimum of 1888; Louisville, Ky., seventeen years record, 5° below minimum of 1875; Indianapolis, Ind., sixteen years record, the same as minimum of 1885; Cincinnati, Ohio, eighteen years record, 9° below minimum of 1885; Columbus, Ohio, eleven years record, 2° below minimum of 1886; Sandusky, Ohio, eleven years record, 2° below minimum of 1888; Davenport, Iowa, eighteen years record, 4° below minimum of 1876 and 1882; Des Moines, Iowa, eleven years record, 6° below minimum of 1888; Keokuk, Iowa, eighteen years record, 2° below minimum of 1877; Cairo, Ill., eighteen years record, 4° below minimum of 1877; Springfield, Ill., ten years record, 1° below minimum of 1888; Saint Louis, Mo., nineteen years record, 1° below minimum of 1877. At Lava, N. Mex., with a record of five years, the temperature was 3° below the minimum of 1885, and at Montrose, Colo., five years record, 1° below minimum of 1888. In the lower lake region the absolute minimum temperature for June, for preceding years, oc-curred at most stations in 1879; in the Rio Grande Valley in 1877; in the extreme northwest in 1888; elsewhere the periods of occurrence were irregular.

RANGES OF TEMPERATURE.

The greatest and least daily ranges of temperature at regular stations of the Signal Service are given in the table of miscellaneous meteorological data. The greatest monthly ranges occurred in the upper Missouri valley, and in the Gila valley in south-central Arizona, where they exceeded 60°. From the Rocky Mountain and southern plateau regions and the upper Missouri valley the ranges decreased towards the oceans and the Gulf coast. The monthly ranges were least along the California coast and over the southern extremity of Florida. where they were less than 20°. On the coasts of North Caro. lina, Rhode Island, southern Massachusetts, and along the north Pacific coast the ranges were less than 40°.

The following are some of the extreme monthly ranges:

Greatest.		Least.					
Rrock Htah	62.0	San Diego, Cal. Key West, Fla. Eureka, Cal. San Francisco, Cal. Block Island, R. I.	21.0				

FROST.

Frost was reported generally throughout the interior of the south Atlantic and east Gulf states and as far south as C. M. Witcher, at Point Peter, Ga., reports that the effect of the frost was plainly visible on cotton, corn, and peas. Damaging frosts were also reported in some parts of Iowa on the 1st, killing tender vegetables and retarding the growth of corn. Frost occurred below minimum of 1882; Savannah, Ga., nineteen years record, most frequently in north-central Colorado, where, at stations, it was reported for nearly every date in the month. The occurrence of frost in June in the south Atlantic and east Gulf states, which, in localities, appears to have affected tender vegetation, is unusual if not unprecedented. Its occurrence attended the low temperature of that date, which, at a majority of the Signal Service stations in those districts, was the the 1st, killing frosts were more than one month later than usual.

Frost was observed by dates during the month as follows: Alabama.—Bermuda, Motes, New Market, Valley Head, 1st.
Arizona.—Belmont, 4th, 5th, 6th. Colorado.—Coulter. 1st to Colorado.-Coulter, 1st to 20th; Frazer, 1st to 14th, 16th to 30th; Fort Collins, 4th; Palmer Lake, 8th, 10th; "B" Grand Lake, 1st to 30th. Dakota.—Spearfish, 2d; Gallatin, 3d, 4th, 15th, 16th. Georgia.—Atlanta, Marietta, Point Peter, 1st; Duck, 1st, 2d, 6th, 7th. Iowa.—Ames, Manson, Oskaloosa, Wesley, 1st; Hampton, 1st, 2d; Bancroft, 1st, 22d; Osage, 2d. Kansas.—La Harpe, 1st, 16th, 20th. Michigan.—Lansing, 23d. Minnesota.—Pokegama Falls, 22d. Missouri.—Glascow, Miami, Mexico, Savannah, 1st. Montana.—Sheldon, 6th, 14th, 24th. Nebraska.— Hay Springs, 4th. Nevada.—Carson City, 14th, 16th. Nev Hampshire.—Berlin Mills, 17th. New York.—Canton, Ilion New York .- Canton, Ilion, Middleburgh, Number Four, 7th, Arcade, 23d. North Carolina.—Lenoir, Mount Pleasant, 1st; Highland, 1st, 2d; Poland, 6th. Ohio.—New Athens, 1st; Wauseon, 4th; Greenville, Shanesville, Westerville, 6th. Oregon.—Fort Klamath, 23d, Pennsylvania.—Head Waters of Bob's Creek, 1st, 2d, $24 ext{th}$. 6th, 7th, 23d; Dyberry, Honesdale, 7th; Wellsborough, 23d, 24th; Philipsburgh, 24th. South Carolina.—Cedar Springs, 1st. Tennessee.— Chattanooga, Fayetteville, McMinnville, Nunnelly, 1st. Utah.—Beaver, 9th, 10th, 11th; Nephi, 9th, 10th. Vermont.—Strafford, 7th; Coventry, East Berkshire, Northfield, 18th. Wisconsin.—Weston, 4th; Embarras, Fond du Lac, 5th; Friendship, 22d. Wyoming.—Cheyenne, 11th.

TEMPERATURE OF WATER.

The following table shows the maximum, minimum, and mean water temperature as observed at the harbors of the several stations; the monthly range of water temperature; and the mean temperature of the air for June, 1889:

Stations.	Т	Mean tem- perature			
	Max.	Min.	Range.	Monthly mean.	of air at the sta- tion.
				•	
Boston, Mass	63.0	54.8	8.2	58.9	69.3
Canby, Fort, Wash	67.5	58.0	9.5	62.1	56.6
Cedar Keys, Fla	90.1	73. I	17. ŏ	84.3	78.5
Charleston, S. C	83.2	76.0	7.2	79.4	76.8
Eastport, Me	47.4	42.6	4.8	45.2	56.9
Galveston, Tex	85.0 88.9	75.0 76.0	10.0	81.3	79.0 80.8
Key West, Fla		55.0	12.9	85.0	63.6
Nantucket, Mass New York City	73·5 68·2	58.4	18.5	67.3	70.4
Pensacola, Fla		72.0	9.8 11.5	64.2 79.6	77.2
Portland, Oregon	74.7	67.9	6.8	71.0	77.2

PRECIPITATION (expressed in inches and hundredths).

Canada for June, 1889, as determined from the reports of the departure from the normal are given for each Signal Serover 2.000 stations, is exhibited on chart iii. In the table of vice station. The figures opposite the names of the geograph-

The distribution of precipitation over the United States and | miscellaneous meteorological data the total precipitation and